NHTSA Phoenix Tire Dataset

During the recent development of new passenger vehicle tire and tire pressure monitoring standards the agency discovered a lack of data on the durability of modern radial tires available in open literature. With further tire research and test development pending, the need was identified for the agency to obtain real world tire data for test development. Additionally, the agency observed from tire recall data that the highest tire failure rates in the U.S. were occurring in the southwestern states. It was felt that the increased rate of tire problems in that region could be related to the accelerated rate of tire compound degradation in the high ambient temperatures. Consequently, the decision was made that any dataset used as a baseline for development of a tire standard should account for the extreme conditions of the American Southwest.

The NHTSA Vehicle Research and Test Center (VRTC) in East Liberty, Ohio was tasked to collect and analyze in-service tires from the Southwest to serve as a comparative dataset for future tire related work. The city of Phoenix, Arizona was selected for the tire collection site due to its high average ambient temperatures and large population. A tire exchange program collected over 600 tires from use in Phoenix during the March-April 2003 timeframe. Twelve different models of light vehicle tires were collected consisting in three relative age groups. The six tire models collected in Phoenix with the best distribution of age and mileage were selected for analysis of material properties and whole tire performance. The results of these six tire types were then compared against new, unused versions each tire model to quantify the amount of degradation in each measured property. All testing was completed under contract by independent, accredited scientific laboratories and administered through the NHTSA VRTC.

Since standards can take years to make it through the final approval and publication process, the decision was made to release the baseline test development dataset from Phoenix (i.e. not part of an actual rule) as soon as it became available. The agency feels that peer review of the test methods and data is important in establishing the validity of the dataset before being used in support of a rulemaking. The dataset includes all available data with the exception of the Vehicle Identification Numbers (VIN) and collection store location, which consumers and businesses requested be kept confidential. Vehicle information collected at the time of tire removal included tire age, mileage of original equipment tires, tire location on the vehicle, etc. A search of VINs allowed the researchers to screen out tires that were on vehicles not registered in Arizona during the entire service life of the tire (i.e. screen out tires with the first 20k miles in Wisconsin and last 5k miles in Phoenix). Rigorous screening criteria were also used in selecting tires suitable for roadwheel testing that did not allow for testing of tires with repairs, foreign objects, damage, etc.

Digital copies of the documents related to the tire collection, test methods, etc., as well as numerical data in a spreadsheet format will be posted on the following website starting March 1st, 2005: http://www-nrd.nhtsa.dot.gov/vrtc/ca/tires.htm This data will be updated as needed. Technical comments on the dataset are encouraged, however please support submissions with data. A full research report with analysis will be issued by the agency at the time of a project completion. Please direct any questions to: James D. MacIsaac Jr., Project Engineer, NHTSA Vehicle Research and Test Center at (937) 666-4511 Ext. 272, or james.macisaac@nhtsa.dot.gov